

Two New Atlantic Clinid Fishes of the Genus *Starksia*

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THE clinid genus *Starksia* Jordan and Evermann comprises a group of New World marine fishes that is characterized by having internal fertilization. The first anal spine in adult males is modified into an intromittent organ, the gonopodium, and the morphology of this structure has been shown (Böhlke and Springer, 1961; Rosenblatt and Taylor, in press) to be of fundamental importance in determining species relationships. Because of its mode of reproduction, the genus has been assumed to be viviparous (Al-Uthman, 1960). Recent studies have shown, however, at least four eastern Pacific species to be ovoviviparous (Rosenblatt and Taylor, in press), although this has not yet been proved for any Atlantic species.

Prior to Al-Uthman's (1960) and Böhlke and Springer's (1961) reviews of the eastern Pacific and western Atlantic species, respectively, only seven species of *Starksia* were recognized, all but one of which were from the western Atlantic. One new Pacific and two new Atlantic forms were described in the above papers, and an additional Atlantic species was later named by Gilbert (1965). Recent fish collections have resulted in 10 more species, three from the Atlantic and seven from the Pacific. Two of the Atlantic species are described in the present paper, and descriptions of the new Pacific forms will soon be published (Rosenblatt and Taylor, in press). In addition, Rosenblatt and Taylor are describing, in the same paper, a new genus and species closely related to *Starksia*. The third new Atlantic species, which differs in several ways from other known members of the genus, is presently under study by James E. Böhlke, of the Academy of Natural Sciences of Philadelphia. The total number of valid species thus is raised to 21 (not including the new genus), of which 12 are from the western Atlantic.

The nominal genus *Brannerella* Gilbert, long regarded as a junior synonym of *Starksia*, was given generic status by Al-Uthman (1960), who listed as its distinguishing features: 1) Gonopodium (first anal spine) longer than second anal spine (shorter in *Starksia*) in adult males; 2) pectoral fin rays 14 (usually 13 in *Starksia*); 3) absence of a black spot in membrane between first and second

dorsal spines (present in *Starksia*); and 4) body size smaller and body color lighter than in *Starksia*. Böhlke and Springer (1961), in resynonymizing the two genera, pointed out that the last three characters break down in the Atlantic species, and that the anal-spine character, by itself, is not sufficient for generic recognition. Should *Starksia* and *Brannerella* continue to be regarded as distinct genera, other equally distinctive morphologic characters found in certain western Atlantic species (e.g., presence or absence of an orbital cirrus; other modifications of the intromittent organ) would necessitate recognition of at least two more genera.

The purpose of this paper is 1) to describe two new species of *Starksia* from Florida and the Bahamas, respectively; 2) to update the key given by Böhlke and Springer (1961) for the western Atlantic members of the genus; 3) to provide additional distributional data for the western Atlantic species; and 4) to provide additional meristic data for *Starksia hassi*, which had previously been known from only eight specimens.

MATERIALS AND METHODS

Counts and measurements follow Hubbs and Lagler (1958), except for those modifications noted by Böhlke and Springer (1961). The main difference in the latter's methods concerns the segmented rays in the dorsal and anal fins, in which all elements are counted rather than tallying the last two as a single ray. One measurement additional (pectoral-fin length) to the eight used by Böhlke and Springer (1961) has been included in this paper. In contrast to the procedure of the last authors, counts are broken down in the two new species, so as to indicate number of pored and unpored scales in the arched portion of the lateral line. In the lists of material examined, the catalogue number appears first, followed by the number of specimens, sex (when known), size range in standard body length (SL), and pertinent locality data. All specimens were collected using rotenone-based fish toxicants (Chem Fish).

The following abbreviations of collections are used in listing material examined: AMNH, American Museum of Natural History; ANSP, Academy of Natural Sciences of Philadelphia; UF, University of Florida (Florida State Museum); UMML, Institute of Marine and Atmospheric Sciences, University of Miami; USNM,

United States National Museum. I wish to thank the individuals in charge of those collections from which specimens were examined for making this material available. I also wish to thank C. Lavett Smith, American Museum of Natural History, Walter A. Starck, II, and Philip C. Heemstra, University of Miami, all of whom helped collect specimens of the new species; and Russell Parks, University of Florida, who took the photographs and also aided in the field work. Collections of the new Bahaman species were made during cruises of the Lerner Marine Laboratory vessel *J. A. Oliver*, operating with funds supplied by ONR grant no. 552(07). The cooperation of the Bahaman government, for furnishing collecting permits, and of the authorities of the Lerner Marine Laboratory (particularly the director, Dr. Robert F. Mathewson) is gratefully acknowledged.

Starksia elongata new species (Fig. 1A)

Holotype. UF 14134, adult male, 26.8 mm SL, south side of Rum Cay (Bahamas), near Sumner's Point, ca. 3/4 mi. offshore, depth 5-10 ft., 4 Sept. 1966, C. R. Gilbert and P. C. Heemstra (field no. G 66-43).

Paratypes (all from Bahamas). AMNH 23232 (1 male, 23.6), Cat I., off creek near Dolphin's Head, depth 8 ft, 10 Nov. 1964, C. L. Smith, H. E. Winn, and G. Offutt (field no. S 64-73); AMNH 28998 (1 male, 25.2), Ragged I., near northwest end of Nurse Cay (small patch reef), depth 10 ft, 7 July 1965, C. L. Smith and H. Tischler (field no. S 65-77); AMNH 28999 (1 female, 17.4), UMML 27336 (1 male, 21.4), USNM 205199 (1 male, 19.5), Little Ragged I., West Point, depth 15 ft, 10 July 1965, C. L. Smith, H. Tischler, and J. Strum (field no. S 65-83); AMNH 29000 (1 unsexed, 13.0), ANSP 109799 (1 female, 22.4), Acklins I., Salena Pt., depth 10 ft, 9 March 1966, C. L. Smith and J. Sohn (field no. S 66-12).

In addition to the above, a small specimen (9.0 mm), of undetermined sex, from station S 66-12 probably represents this species. It differs from other material in only having six body bars instead of seven, although this likely is a function of size and/or age. Fin rays and body scales could not be counted.

Diagnosis. A species of *Starksia* with essentially naked venter; simple orbital cirrus; genital papilla and first anal spine in adult male united along entire length, the papilla barely projecting be-



Fig. 1. A, *Starksia elongata* (holotype), UF 14134, adult male, 26.8 mm SL, Rum Cay (Bahamas), 5-10 ft.; B, *Starksia starcki* (holotype), UF 10874, adult female, 27.3 mm SL, Looe Key (Florida), 5-20 ft.; C, *Starksia starcki* (paratype), UF 16188, immature female, 20.3 mm SL, Looe Key (Florida), 15-25 ft.

yond tip of spine; pores from circumorbital ossifications mostly paired (biserial); dorsal rays XX-8 (2), XXI-8 (6); anal rays II-17 (1), II-18 (7); pectoral rays 14-14 (7), 15-15 (1); lateral-line scales 16+1+20 (3), 16+1+21 (4), 17+1+20 (1). Distinguished from its closest congeners, *S. ocellata* and *S. guttata*, by a longer first anal spine, which is almost twice length of second spine (instead of only slightly longer; general appearance otherwise as in Böhlke and

Springer, 1961, fig. 16), a more slender and elongate body, color pattern, and (apparently) maximum body length. Color pattern consisting of seven well defined, broadly but evenly spaced, dark brown bars on side of body, the first bar situated below third dorsal spine and the last (the hypural markings) at base of caudal fin. The only other western Atlantic *Starksia* having a similar pigmentation pattern is *S. fasciata*. The largest specimen of *S. elongata* examined, an adult male, was only 27 mm SL, whereas both *S. ocellata* and *S. guttata* reach at least 40 mm.

Description. Proportional measurements appear in Table 1. Characters listed in the diagnosis are not repeated, except where clarification is required.

Pelvic rays 1,2; segmented caudal rays 13 (7+6).

Narrow simple cirri present on nape, top of eyeball, and rear margin of anterior nostril, the cirri subequal in length; teeth present on vomer and palatine bones; most or all scales of posterior part of lateral line with tubes and pores (in holotype tubes are present on all but three of last four scales); third pelvic ray not evident in unstained material; pectoral fin extending posteriorly to around base of second anal spine; pelvic fin not reaching anus; venter naked except for a few scales immediately anterior to anus; body elongate and narrow for a *Starksia*, the body depth only slightly greater at nape than at caudal peduncle.

Bars on side of body of moderate width, about half as wide as intervening light areas, the bars meeting dorsally but not ventrally; anterior three or four bars relatively straight, posterior three or four crooked; most posterior bar (the hypural marking) interrupted in center, the pigment continuing, at a 90° angle, a short distance anteriorly; a moderate-sized, rather faint spot directly posterior to and bordering middle of orbit, and a very faint spot at lower posterior corner of (but not bordering) orbit; anterior two-fifths of upper and lower lips covered by small melanophores, as is anterior fifth of gular area; small melanophores scattered on upper half of opercle; heavy concentrations of melanophores in predorsal area and on top of head behind orbits and between lateral canals; remainder of head without pigment; a very faint edging of melanophores extending along outer margin of dorsal fin, and a few melanophores in both anal and caudal fins; no pigment on pectoral or pelvic fins or at their respective bases; pigment from bars on side of body encroach-

TABLE 1
Starksia elongata: Selected measurements (in thousandths of standard length) and counts

Catalogue no.	UF	AMNH	AMNH	AMNH	UMML	USNM	AMNH	ANSP
Sex	♂	♂	♂	♀	♂	♂	♀	♀
Std. lgth (mm)	26.8	23.6	25.2	17.4	21.4	19.5	13.0	22.4
Head lgth	310	318	310	333	322	328	346	321
Snout lgth	60	81	71	80	79	72	77	67
Upper jaw lgth	146	131	147	149	140	138	154	134
Eye diameter	78	85	79	92	79	87	92	80
Body depth	157	153	178	201	187	179	177	174
1st D spine lgth	90	85	99	103	107	113	115	89
Pectoral fin lgth	250	280	258	287	280	287	246	277
Pelvic fin lgth	198	191	179	224	220	221	215	214
Caudal fin lgth	216	220	238	247	—	210	262	—
Counts:								
Dorsal fin	XXI-8	XXI-8	XX-8	XX-8	XXI-8	XXI-8	XXI-8	XXI-8
Anal fin	II-18	II-18	II-18	II-18	II-18	II-18	II-18	II-17
Pectoral fin	14-14	14-14	14-14	14-14	14-14	15-15	14-14	14-14
Lateral line scales	16 + 1 + 21	16 + 1 + 21	17 + 1 + 20	16 + 1 + 21	16 + 1 + 21	16 + 1 + 21	16 + 1 + 21	16 + 1 + 21

ing slightly on base of dorsal fin, not at all on base of anal fin, except for fifth and sixth bars.

Background body color of holotype bright straw in life, the overlying pigmentation chocolate. No other colors noted.

Relationships. As noted previously, *Starksia elongata* evidently is most closely related to *S. ocellata*, a widespread species known from the Carolinas to Brazil, and *S. guttata*, which has been found only along the coast of northern South America and closely adjacent areas. For reasons discussed below, however, the relationships of *S. elongata* appear slightly closer to *S. ocellata* than to *S. guttata*. The most important feature common to the three species is the structure of the gonopodium, which is nearly identical in appearance in *S. elongata* and *S. ocellata*; the only obvious difference is that the length of the first anal spine is nearly twice the length of the second spine in *S. elongata*, whereas in *S. ocellata* the first spine is only slightly longer (Böhlke and Springer, 1961, fig. 16). *S. guttata* apparently differs from both in having the genital papilla projecting slightly farther beyond the tip of the spine (Böhlke and Springer, 1961, fig. 14).

Fin-ray and scale counts in the three species are virtually identical, the only possible differences being that no specimens of *S. elongata* were found to have either 19 anal soft rays or 22 scales in the straight portion of the lateral line, whereas these counts are common in *S. ocellata* (Böhlke and Springer, 1961, table 6); however, the number of specimens of *S. elongata* presently available (eight) is much too small to reach any definite conclusions on this point. Other important similarities concern the paired (biserial) arrangement of pores on the circumorbital ossifications; the narrow, simple cirri on the nape, eyeball, and rear margin of the anterior nostril; and the absence of scales from all but the posteriormost part of the venter.

In addition to its gonopodial structure, the geographic distribution of *S. elongata* suggests a closer phylogenetic relationship to *S. ocellata* than to *S. guttata*. It is more parsimonious to assume derivation of *elongata* either directly from *ocellata* or from a common ancestral form living in the Florida-Bahamas area, than from the geographically more distant *S. guttata*.

Ecology. All specimens of *S. elongata* were collected from small to medium-sized coral formations in shallow water (5-15 ft)

of the southern Bahamas. Other species of *Starksia* taken at the type locality include *S. atlantica*, *S. fasciata*, and *S. lepicoelia*. Although the closely related *S. ocellata* also is a reef dweller, it seems to occur only in areas having some degree of continental influence (Gilbert, in press). All of the islands from which *S. ocellata* was recorded by Böhlke and Springer (1961, pp. 55-56) have, in contrast to the Bahamas, a high relief, and thus surface runoff (and consequently some water turbidity) is often present.

S. elongata appears to be a rare species and also one of restricted range. It is surprising that only eight specimens have, till now, been recorded from the hundreds of shallow Bahaman reef collections. Inasmuch as the northern Bahamas have been particularly well surveyed, it seems reasonably certain that the species is not present there.

Etymology. The species name *elongata* is in reference to the unusually slender and elongate body.

Starksia starcki new species (Figs. 1B and 1C)

Holotype. UF 10874, adult female, 27.3 mm SL, Looe Key, ca. 4½ mi. SSW of Little Torch Key (and US hwy. 1), Monroe Co., Florida depth 5-20 ft, 1-2 Nov. 1963, C. R. Gilbert and R. Parks (field no. G 63-44).

Paratypes. UF 17279 (1 immature male, 20.5), same data as holotype; UF 16188 (1 immature female, 20.3), ANSP 109800 (1 adult female, 26.3), UMML 27335 (1 adult female, 26.4), USNM 205200 (1 adult female, 26.0), Looe Key, same general area as G 63-44, depth 15-25 ft, 6-7 August 1967, C. R. Gilbert and W. A. Starck, II (field no. G 67-46).

Diagnosis. A species of *Starksia* with a fully scaled venter; simple orbital cirrus; pores from circumorbital ossifications single (uniseriate); dorsal rays XX-9 (4), XXI-8 (1), XXI-9 (1); anal rays II-18 (2), II-19 (4); pectoral rays 13-13 (6); lateral-line scales 13+1+22 (4), 14+1+21 (1), 14+1+22 (1). Distinguished from its presumed closest congener, *S. lepicoelia*, by a higher anal soft-ray count (usually 18 or 19 vs. usually 17), a higher number of total dorsal elements (usually 29 vs. usually 28), and color pattern. Color pattern consisting of eight or nine irregular, broken, widely-spaced, chocolate bars on body, which contrast strongly with a light

background; in one specimen (Fig. 1C) only the first three bars are complete and the remaining bars are replaced by a broken horizontal line. In *S. lepicoelia* pigmentation is either absent from the sides of the body or, if present, consists of broad, narrowly spaced bands that do not contrast sharply with the background.

Description. Proportional measurements appear in Table 2. Characters listed in the diagnosis are not repeated, except where clarification is required.

Pelvic rays I, 2; segmented caudal rays 13 (7+6).

Narrow simple cirri present on nape, top of eyeball, and rear margin of anterior nostril, the cirri subequal in length; teeth present on vomer and palatine bones; most or all scales of posterior part of lateral line with tubes or pores or both, the tubes uniformly present on about anterior ten scales, present only on some individual scales posteriorly; third pelvic ray not evident in unstained material; pectoral fin extending posteriorly to above base of third anal soft ray; pelvic fin reaching almost to anus.

First bar, on posterior part of head, circling nape; last bar (the hypural markings) interrupted in center, the pigment continuing, at a 90° angle, a short distance anteriorly; a large, round blotch of pigment immediately posterior to, and bordering, median section of orbit; another large blotch, slightly less intense, situated at lower posterior corner of orbit; much of opercle covered by pigment, which is, in effect, a continuation of the predorsal saddle; a small, dark humeral spot a short distance above upper part of pectoral base; a large brown blotch on lower half of pectoral base; two small blotches on extreme lower part of pectoral fin, one bordering upper margin, the other situated three-fourths to four-fifths of way down; pigment otherwise absent from most of pectoral fin, except for some melanophores outlining rays; pigment from bars on side of body encroaching a short distance onto dorsal and anal fins.

The maximum standard body length probably is less than 30 mm, based on the limited material available.

Relationships. Inasmuch as an adult male specimen of *S. starcki* is not yet available, one cannot be certain of the species' relationships. It is believed to be closest to *S. lepicoelia*, however, a premise based on the mutual presence of a completely scaled belly, general similarity in body pigmentation with some populations of *S. lepicoelia* (Böhlke and Springer, 1961, fig. 5C), and similar scale

TABLE 2
Starksia starcki: Selected measurements (expressed in thousandths of standard length) and counts

Catalogue no.	UF 10874	UF 17279	UF 16188	ANSP 109800	USNM 205200	UMML 27335
Sex	♀	♂	♀	♀	♀	♀
Std. lgth (mm)	27.3	20.5	20.3	26.3	26.0	26.4
Head lgth	311	322	305	316	312	299
Snout lgth	66	73	74	72	69	68
Upper jaw lgth	147	137	128	125	123	144
Eye diameter	81	83	84	80	88	87
Body depth	179	185	182	171	177	170
1st D spine lgth	84	88	89	76	77	87
Pectoral fin lgth	275	312	296	278	262	265
Pelvic fin lgth	201	239	227	240	235	208
Caudal fin lgth	267	268	256	251	250	258
Counts:						
Dorsal fin	XX-9	XX-9	XXI-9	XXI-8	XX-9	XX-9
Anal fin	II-19	II-19	II-19	II-18	II-18	II-19
Pectoral fin	13-13	13-13	13-13	13-13	13-13	13-13
Lateral line scales	13 + 1 + 22	13 + 1 + 22	13 + 1 + 22	14 + 1 + 22	14 + 1 + 21	13 + 1 + 22

and pectoral ray counts. Soft dorsal and anal ray counts are higher than in *S. lepicoelia* (Böhlke and Springer, 1961, Table 1), although some overlap does occur.

Ecology. All specimens of *Starksia starcki* have been taken from Looe Key, in the lower Florida Keys, in surge channels less than 25 feet deep. A total of 48 specimens of *S. ocellata* (the only other *Starksia* known from Florida) were taken in the same collections. It is remarkable that *S. starcki* has not otherwise been encountered in the numerous collections made throughout the Florida Keys. It thus is one of the relatively few Florida endemics, although one might anticipate that the species eventually will be found in Cuba.

Etymology. This species is named for Dr. Walter A. Starck, II, in recognition of his many contributions to marine biology, especially ichthyology.

DISTRIBUTION OF WESTERN ATLANTIC SPECIES

The following is a list of geographic localities from which the various western Atlantic species of *Starksia* have been recorded. For brevity's sake, authors names have been shortened as follows: Böhlke and Springer (1961) (B & S); Hildebrand, Chavez, and Compton (1964) (H, C, & C); Gilbert (1965) (G); Birdsong and Emery (1968) (B & E); Cervigon (1968) (C). All new records are based on specimens in the ANSP, UF, UMML, and USNM, except for specimens of *S. ocellata* from Panama, which are in the collection of Scripps Institution of Oceanography. Records listed by Birdsong and Emery (1968) from "off Nicaragua" are either from Courtown or Albuquerque Cays, both approximately 150 miles offshore; those from "off British Honduras" are from Turneffe Island and/or Lighthouse Reef (both within about 50 miles of shore); and those "off Yucatan" are all from Banco Chinchorro, which is a short distance off the southeastern coast. Meristic data for the Bahaman specimens of *S. hassi* follow the records for that species.

S. atlantica: B & S, Bahamas; B & E, off Nicaragua (Courtown Cays), off British Honduras (Turneffe I. and Lighthouse Reef), off Yucatan. New records: Haiti, Antigua, Old Providence I.

S. lepicoelia: B & S, Bahamas; Virgin Is.; H, C, & C, off Yucatan (Alacran Reef); G, Grand Cayman I.; B & E, off Nicaragua (Albuquerque Cays), off British Honduras (Turneffe I. and Lighthouse Reef), off Yucatan. New records: Antigua, Honduras, Old Providence I.

S. nanodes: B & S, Bahamas, Virgin Ids.; G, Grand Cayman I.; B & E, off Nicaragua (Albuquerque Cays), off British Honduras (Turneffe I.). New records: Haiti, Old Providence I.

S. fasciata: B & S, Bahamas, Cuba; G, Antigua, Dominica.

S. sluiteri: B & S, Old Providence I., Venezuela; G, Antigua, Dominica.

S. y-lineata: G, Grand Cayman I.; B & E, off Nicaragua (Courtown Cays) (erroneously listed as Yucatan by Gilbert [1969]).

S. guttata: B & S, Trinidad.

S. ocellata: B & S, North Carolina, South Carolina, Florida, Cuba, Haiti, Puerto Rico, Virgin Ids., Grenadines (Lesser Antilles), Old Providence I., Brazil, questionably from Bahamas; C, Venezuela. New record: Panama.

S. hassi: B & S, Netherlands Antilles (Bonaire), off Puerto Rico, off Virgin Ids.; C, Venezuela (total of eight specimens). New records: Bahamas (six localities; total of 15 specimens), off Panama (1 specimen), off Antigua (4 specimens), off Guadeloupe (1 specimen). Counts for 18 specimens listed under "new records:" Dorsal rays XIX-8 (1), XIX-9 (3), XX-8 (10), XX-9 (3), XXI-9 (1); anal rays II-16 (2), II-17 (6), II-18 (10); pectoral rays 12-13 (1), 13-13 (19), 13-14 (1), 14-13 (1); tubed anterior lateral-line scales 9 (4), 10 (9), 11 (3).

KEY TO DESCRIBED WESTERN ATLANTIC SPECIES OF *Starksia*

1. No orbital cirrus; a prominent round dark spot, about three-fourths of eye, enclosing base of last dorsal rays; genital papilla, in adult male, attached to first anal spine proximally for a distance about half its length

Starksia atlantica Longley

A single orbital cirrus above each eye; round spot either absent around base of last dorsal rays or, if present, much less than three-fourths diameter of eye; genital papilla in adult male either completely free or attached to first anal spine for entire length of spine (often projecting beyond tip). (Fully developed papilla not seen in male *S. starcki*) 2

2. A dark diagonal bar (occasionally reduced to one or two spots in small specimens) on lower part of pectoral base, well separated from proximal ends of pectoral rays; body with alternating dark and light bands, dorsal part of dark bands as wide, or wider than, light bands; venter naked; obvious pelvic rays three; apparently restricted to deep water (all records but two from 85 feet or deeper)

Starksia hassi Klausewitz

No dark diagonal bar on lower part of pectoral base (bar, if present [in *S. lepicoelia*] on upper part of base, closely paralleling proximal ends of pectoral rays); body without alternating dark and light bands or, if these are present, dark band either narrower than light band (*S. fasciata* and *S. elongata*) or bands are associated with a scaled venter (*S. lepicoelia* and *S. starcki*); venter either scaled or naked; obvious pelvic rays two; not restricted to deep water (most records from less than 85 feet) 3

3. Venter entirely and closely scaled 4

Venter either completely naked or with less than posterior one-third scaled 5

4. Eight or nine irregular, widely-spaced, chocolate bands on body, these contrasting strongly with light background (in one of six specimens examined only first three bands present and a broad, incomplete, horizontal stripe extending from third band to caudal fin); anal rays II-18 (two specimens) or II-19 (four specimens); total dorsal elements 29 or 30 (XX-9 in four; XXI-8 in one; XXI-9 in one); known only from Florida (Looe Key)

Starksia starcki new species

Bands either absent from body or, if present, narrowly spaced and not contrasting markedly with background; anal rays usually II-17, occasionally II-18 (ca. 27 per cent of time), very rarely II-16 or II-19; total dorsal elements usually 28, occasionally 27 or 29 (29 ca. eight percent of time); generally distributed throughout Bahamas and Caribbean area, but absent from Florida

Starksia lepicoelia Böhlke and Springer

5. A pair of hypural-shaped dark markings at base of caudal fin; arched lateral-line scales 12 to 14, usually 13; first anal spine of mature male about twice length of second spine; size smaller, maximum body length about 17 mm SL

Starksia nanodes Böhlke and Springer

Hypural-shaped dark markings either present (*S. elongata*) or absent; arched lateral-line scales 14 to 19, usually 15 to 18 (17 or 18 in *S. elongata*); anal spines of mature male subequal in length (except in *S. elongata*, in which first spine is nearly twice length of second); size larger, maximum body length from 20.5 to 41.5 mm SL

6. Pectoral rays modally 13; dorsal spines XVIII to XX (usually XIX or XX); scales in arched portion of lateral line 14 to 16, usually 15; scales in straight portion of lateral line 18 to 20, usually 19; species smaller (to 22.2 mm SL)

Pectoral rays modally 14; dorsal spines XX to XXII (usually XXI); scales in arched portion of lateral line 15 to 19, usually 17 or 18 (only two specimens out of 56 with fewer than 17 scales); scales in straight portion of lateral line 20 to 23, usually 20 to 22; species larger (to 41.5 mm SL)

7. Color pattern consisting of seven dark bands separated by light interspaces

Starksia fasciata (Longley)

Color pattern not as above

8. Color pattern consisting of three horizontal rows of dark blotches on a light background, with the middle series rounded, the upper and lower series more square (the lowest least intense)

Starksia sluiteri (Metzelaar)

Color pattern consisting of a series of narrow, light, Y-shaped markings, on a dark background, on upper two-thirds of body

Starksia y-lineata Gilbert

9. Color pattern consisting of seven well-defined, narrow, dark bars (last bar the hypural markings); body more slender and elongate; anal spine in adult male almost twice length of second spine; species probably smaller, largest observed specimen 27 mm SL

Starksia elongata new species

Color pattern not as above, usually consisting of dots or blotches; body less slender and elongate; anal spine in adult male slightly longer than second spine; species probably larger, reaching at least 40 mm SL

10. Color pattern consisting of numerous randomly distributed round black

dots, sharply defined, on lighter background; head .328-.351 in SL; upper jaw .147-.168 in SL *Starksia guttata* (Fowler)

Color pattern variable, from nearly uniform to rows of irregular and variously distinct blotches; when blotched, dark markings are much larger than in *S. guttata* and difference between blotches and background less abrupt; head .280-.314 in SL; upper jaw .133-.144 in SL

Starksia ocellata (Steindachner)

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